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Nearshore Bathymetry within the Columbia River Littoral Cell

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The Coastal Profiling System developed by Beach et al. (1996) at Oregon State University has been used to characterize nearshore bathymetry at selected sites along the coasts of North Carolina, Oregon, and Washington. The system is comprised of a Yamaha Waverunner III equipped with a differential global positioning system (DGPS) and an echo sounder to estimate depth. The data is collected and stored in an onboard computer system with a daylight readable LCD providing the waverunner driver with valuable GPS and depth readings to monitor the data collection. Preliminary surveys were conducted at Agate Beach, Oregon in February, 1996, after which time, the DGPS was updated to provide real time kinematic corrections (RTK DGPS) for improved vertical accuracy.

Beach et al. (1996) developed the profiling system to provide bathymetry as a tool for understanding the morphology that drives fluid motions in the nearshore zone. In October 1997 extensive testing and ground truthing of the system took place at the SandyDuck '97 field experiment in Duck, NC. Nearshore bathymetric surveys were taken simultaneously by the Coastal Resource Amphibious Buggy (CRAB) and the Coastal Profiling System (CPS). The CPS data interpolated to a gridded surface of the CRAB survey demonstrates errors of less than 0.2 m in the vertical. In July & August 1998, the system was tested as a tool for long-term morphology monitoring by the Southwest Washington Coastal Erosion Study in a regional Coastal Monitoring & Analysis Program (Kaminsky et al., 1997). Due to the energetic nearshore environment of the U.S. Pacific Northwest, the only historic nearshore bathymetric surveys were taken by Willard Bascom et al. over the course of 1945-1947. A 2-3 km section in approximately the center of each of the four sub-cells of the Columbia River littoral cell was surveyed to characterize each region and to reoccupy Bascom profile locations. All sites were characterized by multiple barred profiles with three-dimensional variability. Two offshore sand bars can be identified at each survey site occurring in 2-7 m (NAVD 88) depths with relief O(2m). An additional bar in the swash zone at the 0 m depth contour was resolved in some cross-shore profiles. A series of surveys in April, June, and October 1998 were taken at the northern most site, Copalis, WA to estimate sand bar response to seasonal variability in incident wave conditions.

References

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